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Green Building Program

Project Report [1999-2002]

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San Francisco's Green Building Report 1999—2002

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I. Executive Summary

The Green Building Program within San Francisco's Department of the Environment (SF Environment) has attained the goals set forth in San Francisco Administrative Code Section 82.30. This report to the Board of Supervisors (BOS) is mandated under the Administrative Code and serves as a summary of SF Environment's progress in meeting its goals over the last three years. The goals are as follows:

1) Develop goals, criteria, and strategies for maximizing green building design and operations, and make policy recommendations to the BOS.
2) Develop and oversee a green building training program for City design professionals including department heads, City architects, engineers, construction managers and facilities managers.
3) Form an inter-agency Resource-Efficient Building (REB) Task Force and coordinate with other City Departments including but not limited to the Department of Public Works (DPW), the Public Utilities Commission (PUC) the Department of Building Inspection (DBI), and the Solid Waste Management Program (until it became part of SF Environment in October, 2000) for providing green building advice, assistance, education, outreach and compliance with the REB Ordinance.
4) Assess the efficacy of the Green Building Pilot Program and REB Program on environmental and economic grounds.
5) Provide information to the general public to encourage private sector green building guidelines.

Additionally, the Administrative Code established resource efficiency requirements for City buildings and City leaseholds as well as a Green Building Pilot Project. Ten Green Building Pilot Projects were selected for this program covering a broad range of building types. City design professionals, consulting firms, and departmental project teams have gained much experience about the process of creating environmentally sustainable City buildings. Two Pilot Projects are complete, four have completed the design phase awaiting construction, and four are currently in various stages of design. This Report addresses in detail compliance with the resource efficiency requirements and progress on these pilot projects.

In consideration of the accomplishments and progress to date, SF Environment recommends that an amendment to the REB ordinance be drafted to set LEED Silver[1] as San Francisco's required standard for all new construction and renovation projects over 5,000 square feet. LEED is the rating system developed by the US Green Building Council that evaluates the environmental performance of a building based on proven technology.

[1] LEED: Leadership in Energy and Environmental Design is a rating system developed by the U.S. Green Building Council (USGBC) for evaluating the environmental performance of a building based on existing proven technology. It evaluates performance from a "whole building" perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building". The five categories of evaluation are: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials, and Indoor Environmental Quality. It is a consensus-based system that is rapidly gaining national and international acceptance as a common measurement of sustainable achievement. Buildings are rated on a 4-step scale from lowest to highest: LEED Certified, LEED Silver, LEED Gold, and LEED Platinum. See: www.usgbc.org

II. Background

A. Vision

In July 1997, the San Francisco Board of Supervisors approved The Sustainability Plan (the Plan) for the City of San Francisco. The Plan grew from concerns about environmental issues such as climate change, loss of biodiversity, depletion of resources, and the effect of pollution and chemicals on human health. The Plan reflected the Board's belief that adopting a long-term strategy for municipal planning is in the best interests of the City's residents. The Plan established sustainable development as a fundamental goal of municipal public policy, and called for the creation of a sustainable economy that provides long-term quality of life for San Francisco citizens and visitors, while minimizing impacts to the natural world.

B. History

San Francisco's green building program grew out of work begun in 1996 at San Francisco Public Utilities Commission (PUC)/Bureau of Energy Conservation (BEC). BEC provided energy design training to City staff under a federal grant, and with PUC funding supported increased energy efficient building design measures. San Francisco's Environment Department (SF Environment), BEC and Supervisor Tom Ammiano, in coordination with other City departments, drafted two Resource Efficient Building (REB) Ordinances, which were adopted in May 1999. The first ordinance established a training program for City design professionals, and a set of resource efficiency requirements for City owned facilities and City leaseholds (San Francisco Administrative Code Chapter 82.1-7). The second ordinance established a pilot program to promote resource efficiency in selected City pilot projects (San Francisco Administrative Code Chapter 82.8).

These REB Ordinances established a policy and program requiring and promoting green building standards to increase energy efficiency, save city financial resources, reduce the environmental impacts of demolition, construction and operation of buildings, and create healthy, productive workplaces for city employees and visitors. SF Environment was charged with implementing the ordinances in partnership with DPW and other named City departments.

SF Environment received general funds to provide building design assistance, and program development. In the fall of 1999 SF Environment hired an REB Coordinator to implement the program. In 2000, PUC funding for energy efficient building design was eliminated and the REB Coordinator left city employment. In February 2001, SF Environment hired the current REB Coordinator, additional grant funding was secured, green building assistance contracts were approved and implementation began on training, building design assistance and program development.

III. The Resource Efficient Building (REB) Program

A. *Purpose* – Developing goals, criteria and strategies for REB Program

The REB Program develops goals, criteria and strategies for maximizing green building design and operations and makes policy recommendations for city and private sector green buildings to the

Board of Supervisors. The REB Program provides a Green Building Training Program for City design professionals. Additionally, it coordinates City departments for compliance with the ordinances, and provides green building information and education for City departments and the public. The ordinances established resource efficiency requirements for existing City buildings, and instituted a Pilot Program for the design and construction of new resource-efficient City buildings. Additionally, the ordinances call for the adoption of a standard for measuring green building achievement, instituting a process for ensuring that standards are being met for city buildings, outlining a private sector green building program, and formulating recommendations to increase sustainable building in San Francisco.

B. *Green Building Training Program & Design Toolkit*

The development of the Green Building Training Program began with a survey of City building professionals. Staff of SF Environment in partnership with Global Green USA (GGUSA) determined the current level of expertise in green building. This survey included staff input from DPW/Bureau of Architecture (BOA), Bureau of Engineering (BOE), and Bureau of Construction Management (BCM). Additionally, staff surveyed and evaluated existing green building educational programs in the Bay Area. Staff then designed our Green Building Training Program upon this foundation. This has been a collaborative process with participation from BOA, BOE, BCM, SF Environment, GGUSA and the California Integrated Waste Management Brand (CIWMB). Grant funding from CIWMB made these projects possible. The Training Program has had great acceptance with BOA, and participants have stated that they are applying their new knowledge to projects.

To date the Green Building Training Program has presented the following classes: a Green Building Overview (two sessions), a Green Building Materials Workshop, an Advanced Materials and Indoor

Air Quality Workshop, and an official LEED Training Workshop[1]. Additional classes in energy design at Pacific Gas & Electric's Pacific Energy Center (PEC) are also being recommended in our program, and numerous staff has taken training classes other than those developed by SF Environment. We have trained over forty City staff through this program, and thirty City staff successfully completed the LEED Training Workshop. This workshop gives building designers an in-depth understanding of the LEED Green Building Rating System and how to apply it to the process of designing green buildings. Several participants are preparing to become LEED Accredited Professionals, a designation that will allow them to manage LEED projects for the City.

The Green Building Design Toolkit[2] is completed and its integration into the City's design process is expected to build on the successes of the Training Program and enable all users to have access to its multiple design tools and references. Additional grant funding is being sought to integrate the Green Building Design Toolkit and a Compliance Guide for San Francisco Municipal Buildings into an interactive, web-based design package. One barrier to implementation was that training time for BOA staff is limited. In order for BOA to take advantage of additional training for green building, SF Environment has transferred some of its green building program funds to BOA. In the future, all City departments will need to bear the appropriate costs associated with City environmental programs.

C. ***Task Force***

The REB Ordinance created an inter-agency Resource Efficient Design Task Force to provide educational outreach to City departments, facilitate coordination among City departments in complying with the requirements of the ordinance, and to advise SF Environment staff on implementation of the Pilot Program. Task Force membership includes departmental representation from:

- SF Environment
- DPW—BOA, BCM, and Project Management Divisions
- San Francisco Public Utilities Commission/Hetch Hetchy Water and Power (SFPUC-HHWP)
- SFPUC/San Francisco Water (SFPUC-SF Water)
- San Francisco Pubic Libraries (SFPL)
- Department of Public Health-Occupational Safety and Health (DPH-OSH)
- DBI

The Task Force meets monthly to review program progress and report on departmental compliance with the ordinance.

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[1] *LEED*™: Leadership in Energy and Environmental Design is a rating system developed by the U.S. Green Building Council (USGBC) for evaluating the environmental performance of a building based on existing proven technology. It evaluates performance from a "whole building" perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building". The five categories of evaluation are: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials, and Indoor Environmental Quality. It is a consensus-based system that is rapidly gaining national and international acceptance as a common measurement of sustainable achievement. Buildings are rated on a 4-step scale from lowest to highest: *LEED Certified, LEED Silver, LEED Gold, and LEED Platinum.* See www.usgbc.org.

[2] The Green Building Design Toolkit is a compendium of energy and building design software, web references and green building materials databases to assist City design professionals in the process of green building design.

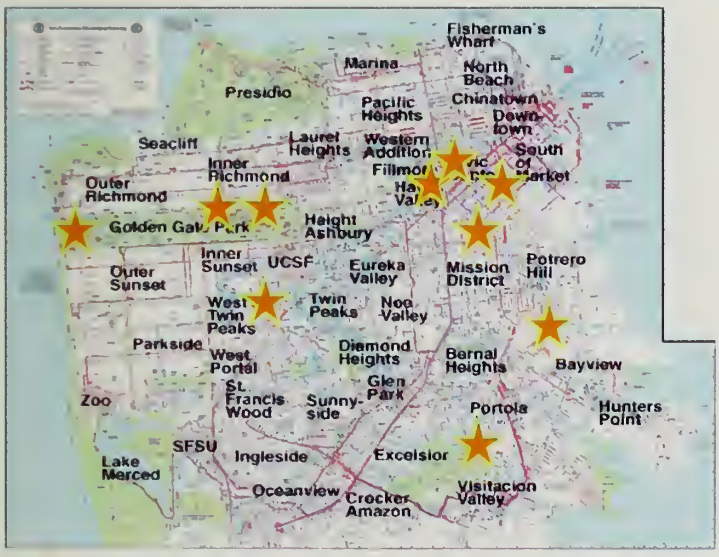
D. *Pilot Program*

The REB Ordinance required that the BOA and the Task Force select a series of Pilot Projects from a slate of prospective City construction projects. Applications were solicited from all City Departments for projects to be included in the Pilot Program. Applications were received from Asian Art Museum (1), San Francisco Public Library (SFPL) (3), San Francisco International Airport (SFIA) (4), Department of Parking and Traffic (DPT) (1), DPW/BOA (1), Recreation and Parks Department (RPD) (3), DPH (1), SF Environment (1), San Francisco Municipal Railway (MUNI) (1), San Francisco Police (1), and California Academy of Science (1).

BOA and the Task Force rated Pilot Project applications on the basis of building type, building size, project scope, public education opportunity, technological opportunity, design team diversity, departmental buy-in, and funding availability. The REB Ordinance required that from five to seven City projects be designated Pilot Projects. BOA and the Task Force determined that a greater diversity of projects would allow more learning opportunities among more City departments, thus a total of ten Pilot Projects were selected for inclusion in the Pilot Program.

The Green Building Pilot Program is the cornerstone of San Francisco's efforts in green building. Additionally, the Pilot Program has given the City great visibility and publicity for this innovative and proactive approach to green building. The ten Pilot Projects cover a diverse range of building types, and offer all design professionals working on City projects an unprecedented opportunity to learn the implementation skills required to create successful and cost-effective green buildings. SF Environment has been instrumental in assembling the multi-disciplinary design teams, and directing the collaborative design process to set realistic environmental goals, solve cross-discipline problems early in the process, and create the best buildings possible.

For photos and complete descriptions of the Pilot Projects see Appendix A.



Map of Green Building Pilot Project Locations

Pilot Projects

1) **EcoCenter and SF ENVIRONMENT--Offices at 11 Grove Street: Interior remodel of existing building**
2) **Moscone West Convention Center: Construction & Demolition Waste Management**
3) **West End Pavilion: New Community Meeting and Event Facility in Golden Gate Park**
4) **Visitacion Valley Clubhouse: New Recreation and Parks Facility**
5) **Mission Park: New Recreation and Parks Building at 23rd & Treat**
6) **New City Administration Office Building at 525 Golden Gate Avenue**
7) **Islais Creek: MUNI Maintenance and Operations Facility**
8) **Laguna Honda Hospital Replacement Project**
9) **California Academy of Science Reconstruction Project**
10) **Golden Gate Music Concourse Underground Parking Facility**

E. *Outreach and Education*

The Green Building Program is a municipal and community resource for information and advice on green building technologies, process, and materials. Staff has compiled a database of architects, engineers, and consultants in green building, which is constantly being updated. Staff has compiled specifications, product literature and samples of green building materials for display (see EcoCenter) and dissemination to interested parties.

Staff consults with various organizations and agencies to lend expertise in green building. These include:

- **San Francisco Public Library Commission**: green building for library bond projects.
- **City College of San Francisco**: green building for construction bond project.
- **National Park Service**: Sutro Visitors Center green building design workshop.
- **San Francisco Solid Waste Management Program**: green building introduction.
- **San Francisco Public Utilities Commission**: consultation on solar bond implementation.
- **San Francisco Planning Department:** green building overview.
- **San Francisco Department of Building Inspection**: residential green building overview.
- **University of California San Francisco**: green building for new Mission Bay campus.
- **Northern California Chapter US Green Building Council**: Government Committee.
- **California Green Building Collaborative**: Bay Area municipal green building network.
- **California Department of General Services**: municipal green building programs.

Additionally, staff presented elements of San Francisco's Green Building Program to San Francisco Planning and Urban Research, Bay Area Association of Energy Engineers, California-Nevada American Planning Association, Pacific Coast Builders Conference, League of California Cities Planners Institute, San Francisco Institute of Architecture and American Society of Landscape Architects.

F. *Additional Projects*

In close cooperation with Brown, Vence & Associates, Inc., the Green Building Program's professional services contractor, SF Environment has completed several additional projects that have enhanced the City's green building efforts: (see Appendix B for details on expenditures)

1. In partnership with the Mayor's Office of Housing (MOH), SFE has developed a green building materials guide for low-income multi-family projects and provided green building design assistance to non-profit housing developers on four projects being planned with MOH.

2. In cooperation with the Alameda County Waste Management Authority, SFE has developed green building new construction and remodeling guidelines for private sector residential construction. Copies of these guidelines will be made available to local builders and remodeling contractors to educate and encourage their efforts in green building.

3. SFE has constructed two Green Building Materials Exhibits for display in the EcoCenter at 11 Grove Street. They will also be used for energy fairs, trade shows, educational venues and other public events.

4. SFE has developed a comprehensive Green Building Materials Guide to illustrate the wide range of green building materials that are available and where they may be purchased in areas stores. This Guide will be included in the residential green building guidelines and available at the green building exhibit in the EcoCenter.

5. SF Environment is developing a Green Building Compliance Guide for San Francisco Municipal Buildings to act as an implementation tool for the proposed LEED Silver amendment to the REB Ordinance. This Guide will reference all the LEED criteria, as well as all other existing City and County of San Francisco and State of California environmental ordinances and regulations regarding the design and construction of buildings.

6. The Green Building Design Toolkit is now being designed in a Web-based form to further enable its distribution and ease of use for City design professionals.

7. SF Environment produced an extensive review of the literature pertaining to productivity and the human factors associated with green buildings, access to natural daylight and ventilation, and healthier work environments. Copies of this report are available at: www.sfenvironment/aboutus/greenbldg/

IV. Assessment of Resource Efficiency Requirements for City Buildings

This section addresses the set of resource efficiency requirements for City owned facilities and City leaseholds set forth in the REB Ordinance and includes new construction, additions, renovations, operations and maintenance activities by all City departments. Information regarding the ordinances was provided to City Purchasing, vendors and to all department heads. In some cases, maintenance supervisors were provided the information directly. Compliance with the ordinance has been strong in some areas and weak in others. The following is an assessment of compliance for each provision.

1. Water Conservation Requirement: All toilets installed in new construction, additions or renovations over $90,000 shall be ultra-low flush (ULF) models, using no more than 1.6 gallons per flush. All toilets in all city facilities shall be replaced with ULF toilets by June 30, 2005. All showerheads installed in new construction, additions or renovations over $90,000 shall use no more than 1.5 gallons per minute. All showerheads in all City facilities shall be replaced with 1.5 gpm models by June 30, 2005.
   Compliance: The Water Department has contacted all of the City's departments by letter about the requirements each fall for the last three years and has conducted inspections of most City facilities.

   a. Toilets: The inspections found that broken toilets are being replaced with water efficient units; however, almost no conversion of working toilets has been done-only 16% of existing toilets are water-efficient. Yet to be replaced are 6,430 toilets (not including the San Bruno Jail and Youth Guidance Center) for a projected annual saving of 3,260,160 gallons of water.

   b. Showerheads: The Water Department reports that none of the City's facilities have changed their showerheads to meet the requirement of a maximum flow of not more than 1.5 gallon per minute showerhead. The Water Department estimates that 1,075 showerheads need to be replaced for a projected annual savings of 2,707,200 gallons of water.

1,075 showerheads need to be replaced for a projected annual savings of 2,707,200 gallons of water.

2. Energy Conservation Requirement: All new and replacement fluorescent lighting fixtures shall include electronic ballast and T-8 lamps. All new or replacement ballasts shall be electronic ballasts. All new and replacement exit signs shall be LED models. All new and replacement exterior lighting shall have automatic controls to prevent their use during daylight hours.
   Compliance: In 1999 departments purchased over 6,000 fluorescent ballasts for replacement of burned out units. Except for 160 specialty ballasts, all were the energy-efficient electronic units. The City PUC has recently restarted a program to replace the tens of thousands of existing inefficient magnetic ballasts remaining in City facilities. For new construction projects, Bureau of Architecture has incorporated the energy efficient fixtures into their standard design requirements.

3. Fluorescent Lamps Recycling Requirement: Commencing 90 days after the effective date of this Chapter, all fluorescent lamp discarded by City Departments shall be recycled. The Solid Waste Management Program shall establish a program for collecting and recycling discarded fluorescent tubes.
   Compliance: The Solid Waste Management Program (now integrated into SF Environment) assisted the Department of Public Health to establish a fluorescent lamp recycling program. Annual fluorescent lamp purchases are approximately 50,000 lamps per year with approximately 42,000 recycled in 2001.

4. Indoor Air Quality Requirement: Department of Environment shall provide informational guidelines for the development of indoor air quality maintenance plans to all City Departments. Departments shall submit and implement indoor air quality maintenance plans.
   Compliance SF Environment is reviewing indoor air quality maintenance plans and developing guidelines for use in City buildings. Except for selected Pilot Projects, no additional indoor air quality plans have been submitted to SF Environment to date.

5. Recycling Area Requirement: All City Departments shall ensure that adequate, accessible, and convenient recycling areas are provided in existing buildings and in new construction projects.
   Compliance: Except for pilot projects, no assessment of compliance with this provision has been conducted. BOA is incorporating this requirement into their standard contract.

6. Construction and Demolition Waste Requirement: The contractor shall prepare and submit to the City Project Engineer a written construction and demolition debris management plan.
   Compliance: Except for the Pilot Projects, no construction and demolition waste management plans have been submitted. BOA is incorporating the requirement into their standard contract.

Summary: The large volume of projects performed by City departments has made enforcement of some requirements very difficult. In particular, there was minimal attempt to obtain compliance with the requirement for submittal of plans for Indoor Air Quality and for Construction and Demolition Waste Management.

V. Overall Recommendations to Board of Supervisors

A. Recommendation #1

SFE recommends passage of an amendment to the REB Ordinance to set LEED Silver as the required standard for all future City projects over 5,000 square feet in size. Such an amendment is under development by SF Environment, BOA and the City Attorney's Office, with assistance from professional services contractors Brown, Vence & Associates (BVA) and Global Green USA.

As noted earlier in this report LEED, as developed by the US Green Building Council, is a national and international standard for measuring the achievement of green buildings. LEED rated buildings are registered with USGBC during the design process, and become fully certified upon completion of construction. LEED is focused on five major areas of environmental sustainability:

- Sustainable Sites
- Energy and Atmosphere
- Water Efficiency
- Green Building Materials
- Indoor Air Quality

Prerequisites are specified in each of the categories, and points must be earned in each category for a building to become certified. LEED also allows for Innovation Points to encourage processes and technologies that are not yet mainstream, but show innovation and creativity in building design. Buildings are rated on a 4-step scale from lowest to highest: LEED Certified, LEED Silver, LEED Gold, and LEED Platinum.

Many governmental agencies and municipalities across the United States have adopted LEED as their environmental standard for new buildings. Among those who have adopted LEED are:

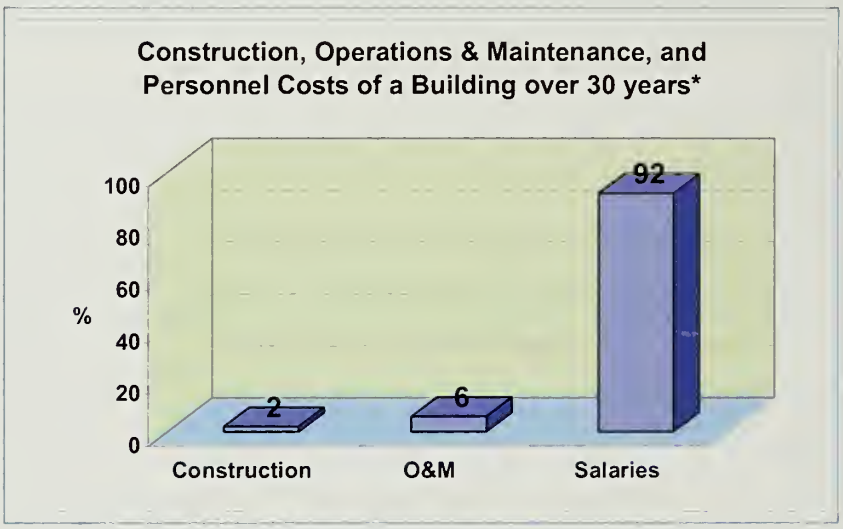
- City of Los Angeles; LEED Certified for all buildings over 7,500 sq. ft.
- Portland, Oregon; LEED Certified for all city-funded projects over 10,000 sq. ft.
- Portland, Oregon; Tax Credits for private development projects achieving LEED Silver.
- City of San Jose; LEED Certified for all city projects over 10,000 sq. ft.
- County of San Mateo; highest practicable LEED rating for all projects over 5000 sq. ft.
- City of Seattle, Washington; LEED Silver for all buildings over 5000 sq. ft.
- General Services Administration (GSA) of the Federal Government; LEED Certified for all new construction.

Additionally, the State of California is working toward adopting a State version of LEED for all State buildings, New York City is considering the adoption of LEED, and Austin Texas is using LEED Silver as a goal for their new 115,000 sq. ft. City Hall.

SFE and BOA agree that current standard City design practice is very close to the level of LEED Certified. LEED Silver is a step higher on the LEED scale, and will "raise the bar" in the City's commitment to green building. Initially, there will be some additional design-related costs to achieving LEED Silver, however, based on the experience of other municipalities who have adopted LEED as a standard, the collaborative effort expended in the initial stages of a project allow for more design flexibility. Additional costs can be expected to decrease with experience and integration of LEED into the building design process. Moreover, when long-term green building operational

savings of reduced energy use, water use and maintenance are accounted for, total costs to the City are even lower.

In terms of human factors, studies show that green buildings can improve employee productivity, eliminate sick-building syndrome, and reduce absenteeism and workers compensation claims. Buildings with access to fresh air and natural daylight aid recruitment and retention of employees. As noted earlier in this report, SFE has produced a review of the literature regarding productivity and green buildings. When analyzing building-related costs over a 30-year span, construction, operations and maintenance are 8% of the costs of owning a building, while the salaries of the employees that work in that building total 92% of the costs. Even a small improvement in working conditions and a healthy indoor environment can pay very large dividends to employers and building owners. See chart below:



*Intergovernmental Panel on Climate Change: the 1990 and 1992 IPPC Assessments (Geneva, Switzerland; World Meteorological Organization and United Nations Environment Program, 1992.)

The proposed amendment will:

- Require LEED Silver for all projects over 5,000 square feet, where reasonably feasible.
- Require a Sustainability Assessment prior to setting initial project budgets. A LEED Accredited Professional will perform the assessment.
- Require consultation with SF Environment and BOA for projects over 15,000 square feet, or if the proposing department feels that they cannot achieve the LEED Silver standard.
- Require that a LEED Accredited Professional be a member of the design team.
- Require that BOA sign off on project green building goals before a building permit is issued.
- Require that annual reports be submitted to the Board of Supervisors on all projects in project definition phase, project design phase or project construction phase during the year.
- Require that all projects of less than 5,000 square feet in size follow the Resource Efficiency Requirements.

B. Recommendation #2

SFE recommends a future amendment to the REB Ordinance to include the following improvements to the resource efficiency requirements for all City buildings.

1. The Water Department should work with departments to plan for conversion to water-efficient units and report annually on conversion progress.

2. All magnetically ballasted fluorescent fixtures should be replaced with high efficiency electronic ballasts by 2005. The PUC should work with departments to plan for conversion to more efficient lighting technology and report annually on progress.

3. Replacing incandescent lamps can provide quick and substantial energy savings. Because conversion is not appropriate in all cases, guidelines should be developed by the PUC and incorporated into City purchasing procedures. PUC should update the guidelines periodically.

4. No permit will be issued by the Department of Building Inspection for new construction or renovation projects over $90,000 unless the Project Engineer has submitted an Indoor Air Quality Management Plan and a Construction and Demolition Waste Management Plan.

5. No permit will be issued by Department of Building Inspection for new construction or renovation projects over $90,000 unless the project documentation designates an area of recycling. BOA and SF Environment should develop and distribute implementation guidelines.

6. All new City buildings will be required to exceed California Title 24 energy efficiency standards by a minimum amount.

7. All City construction projects will avoid the use of old-growth timber through the use of certified sustainable harvested wood products.

8. All City construction projects will reduce or eliminate the use of PVC, arsenic-treated wood, and mercury.

9. The City's Environmentally Preferable Purchasing Program (EP3) will be expanded to include commonly used building materials.

Appendix A
San Francisco's Green Building Pilot Projects

1. EcoCenter and SF Environment Offices at 11 Grove Street

SF Environment

The EcoCenter at 11 Grove Street is San Francisco's first green building pilot project. It serves as an environmental outreach and education center for the public and as offices for San Francisco's Department of the Environment. The building is a City leasehold, and the interior was remodeled to SF Environment's environmental specifications.

The EcoCenter is located 100 feet from both MUNI and BART, making for convenient public access by transit, thus reducing car use, air pollution and traffic congestion. Workstations are located in proximity to natural daylight from windows, and energy-efficient lighting has automatic controls that dim the lighting when daylight is available. Occupancy sensors turn off lights in unoccupied spaces. The EcoCenter uses carpets with recycled content, recycled rubber flooring for the wheelchair access ramp, and several green flooring products including bamboo, reclaimed wood, and lincleum. Workstations are made from 98% recycled materials and agricultural waste, and workstation dividers are made from compressed cellulose from recycled newspaper. Non-toxic paint is used to protect indoor air quality. The EcoCenter celebrated its grand opening in September 2000.

2. Moscone West Convention Center

Demolition of 150 Fourth Street Office Building

New Moscone West Convention Center

WRAP
WASTE REDUCTION AWARDS PROGRAM
2001 WINNER

THE MOSCONE CENTER

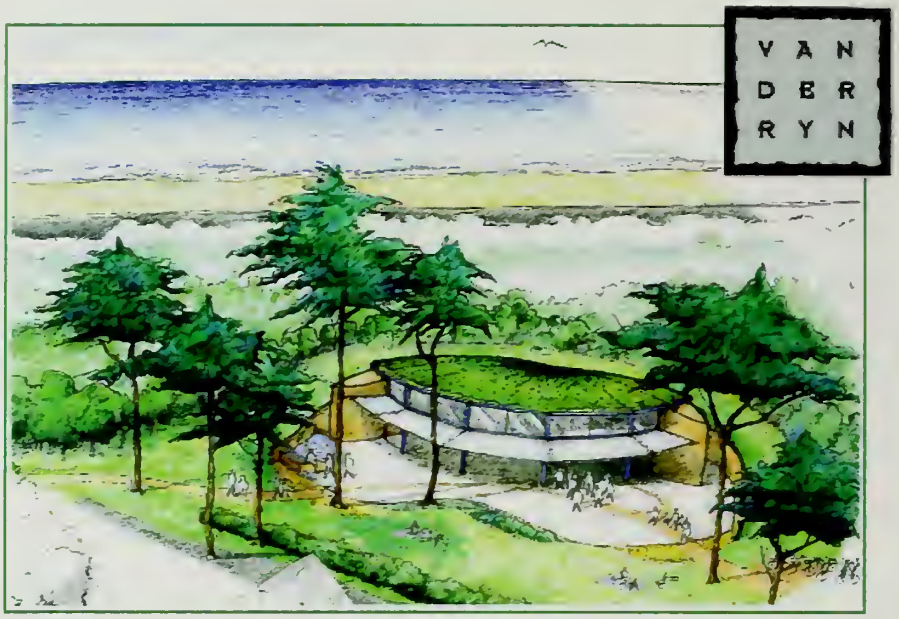
MOSCONE WEST

Reusing and recycling a maximum of the construction and demolition (C & D) waste was the focus of this pre-construction Pilot Project, which involved the demolition of two buildings and excavation of the site for the Moscone West. An innovative C&D waste management specifications required that waste be tracked for reuse and recycling. An experienced contractor was awarded the project and with the guidance and proactive outreach by the City and County of San Francisco's Department of the Environment, more than 80% of C & D waste was diverted from the landfill. A total of 13,000 tons of material including concrete, rebar, asphalt, copper pipe, carpet, kitchen equipment, cabinets, and electrical equipment were either salvaged for direct reuse or recycled. In addition, 64% of the soil (113,000 cubic yards) excavated from the site was reused on another construction site instead of being taken to the landfill. These recycling and salvage measures resulted in a lower demolition project cost than if all materials had been sent to landfills.

MOSCONE CENTER

The California Integrated Waste Management Board, the State's primary recycling agency and a part of the California Environmental Protection Agency, honored Moscone Center as one of California's ten top business waste cutters for reducing the amount of material it disposes through recycling, reuse, and donations to charitable organizations. In 2001, the prestigious Governor's Award for Economic and Environmental Leadership recognized the accomplishments of Moscone's recycling program. Moscone Center was also named as a winner of the ninth annual Waste Reduction Awards Program "WRAP" of the Year award for 2001, and recognized for outstanding efforts to conserve resources and protect the environment.

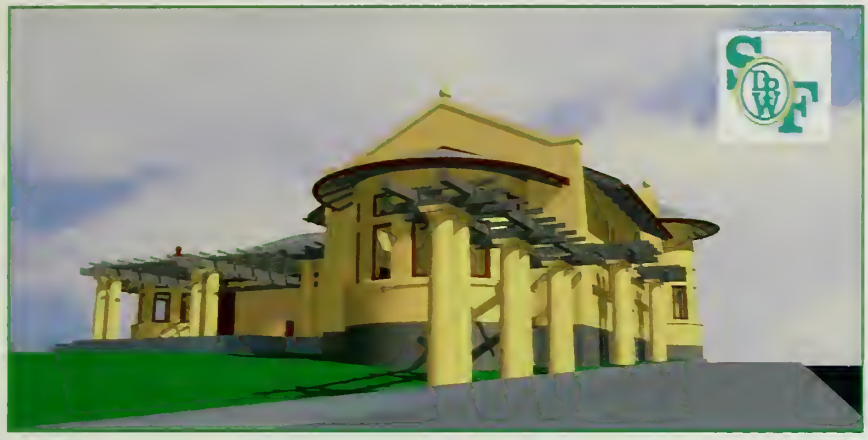
3. West End Pavilion



FRIENDS OF RECREATION & PARKS

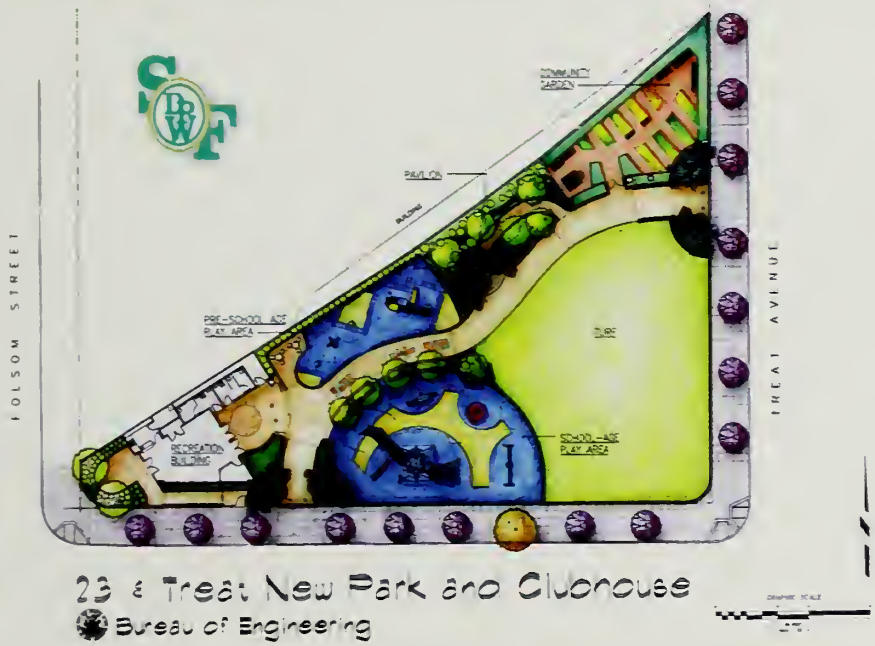
The site for this community meeting and event facility is located in the west end of Golden Gate Park near the windmills. The project is privately funded through Friends of Recreation & Parks, and the building is designed by Van der Ryn Architects, an award-winning green architecture group. Green building features include a living roof covered with native plants to reduce stormwater runoff, add insulation, and provide natural habitat. Extensive berming of the north side further insulates the building and blends it into the natural ecology of the park. Natural lighting through a full-height south-facing window-wall reduces the need for artificial lighting and provides passive solar heating in the winter. A light shelf bounces the daylight farther into the structure and reduces interior glare. Energy efficient lighting with automatic dimming controls reduces energy use, and a single water heater provides hot water for bathrooms and kitchen, and also heats the building through a radiant floor. Water-efficient fixtures save valuable natural resources, and save on water and sewer costs. Concrete used in the foundation contains flyash, a waste product of coal-burning power plants. This diverts a waste material from landfills, and makes concrete stronger. Wall insulation is cellulose from recycled newspaper, and recycled materials are used in the manufacture of many other building materials and interior furnishings. Wood used on this project is certified from sustainably harvested forests that protect old-growth trees. Fiberboard cabinets are formaldehyde-free so that indoor air quality is maintained. The contractor was selected for experience in green building. The West End Pavilion is scheduled to begin construction in the fall of 2002.

4. Visitacion Valley Clubhouse



This Pilot Project, designed by BOA/DPW for San Francisco's Recreation and Park Department will replace an existing community recreation center in Visitacion Valley. C & D waste management will divert demolition materials from landfills. Green building features include natural ventilation with operable windows, energy efficient lighting with dimming controls. skylights and south facing windows for natural daylighting and passive solar heating, extensive overhangs to reduce interior glare, water efficient fixtures, and many examples of sustainably-sourced building materials. Visitacion Valley Clubhouse is slated to begin construction in summer 2002.

5. 23rd & Treat New Mission Park and Clubhouse



This new recreation center and playground at 23rd and Treat Street in the Mission District is also designed by BOA/DPW for the Recreation and Park Department. This Pilot Project will incorporate a variety of green building features including natural daylighting, recycled-content construction materials, and non-toxic paints. Landscaping will emphasize native plants and a community garden.

6. San Francisco Administration Office Building at 525 Golden Gate Avenue

This Pilot Project (14 stories, 250,000 square feet) will give the City and County of San Francisco a high profile for its commitment to excellence in green building. The New Administrative Office Building at 525 Golden Gate Avenue was conceived as the first in a series of City office buildings to house City Departments currently in leaseholds around the Civic Center.

DPW/BOA is the Project Manager, and KMD | Stevens Architecture has been retained as the project architect through an innovative selection process that required green building design experience and inclusion of a green building consultant as part of the design team. Collaborative environmental goal setting sessions set LEED Silver as a goal for the design of the building.

Many cutting-edge technologies are included in the design. The building envelope, plus the lighting and mechanical systems, are designed to use 20% less energy than is required by the stringent California Energy Code (Title 24). Spectrally tuned glazing materials will capture and reject solar heat as needed. Generous window areas with light shelves and shading devices will allow natural light to penetrate to the interior of the building, while reducing interior glare and cooling loads. The shading devices will also be clad with solar electric panels or building integrated photovoltaics (BIPV) that will generate a portion of the building's electrical needs and reduce dependence on electricity generated from fossil fuels. A raised floor ventilation system increases energy efficiency, and will allow individual occupant control over heating, ventilating and cooling at each workstation. Many examples of sustainable, durable, non-toxic and recycled-content building materials have been specified to protect natural resources and enhance indoor air quality. Underground parking is not provided as a part of this project in order to minimize building height and encourage the use of transit alternatives. The C & D waste management plan for demolition of the existing building on the site specifies that more than 90% of the waste material will be diverted from the landfill and recycled.

This project marks the first time the City has used a cost-benefit analysis to demonstrate how long-term green building operational savings of reduced energy, water and maintenance help offset capital costs. This project is currently on hold pending the approval of funding.

7. Islais Creek—MUNI Maintenance and Operations Facility

Robin Chiang & Company

San Francisco Municipal Railway

The Islais Creek Muni Facility is designed by Robin Chiang and Company as an administrative office and a maintenance garage for the San Francisco Municipal Railway. This facility will showcase a number of green building features such as windows that cut glare while reducing heating and cooling requirements, natural daylighting through clerestory windows in the bus maintenance areas, durable recycled-content and sustainably harvested building materials, and high performance lighting that improves visual acuity while reducing electrical use. This project will include the capability to service alternative fuel buses that use compressed natural gas (CNG), lessening San Francisco's dependence on diesel fuel and reducing air pollution. SF Environment provided energy design assistance to the project through a contract with the mechanical engineering firm Newcomb Anderson Associates (NAA). The project is a candidate for solar electric panels due to its location in the sunnier southeast sector and its large angled roof sections.

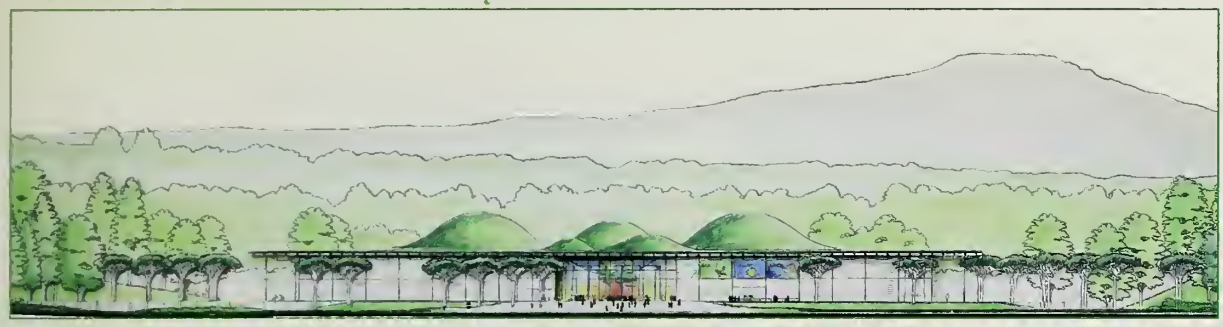
8. Laguna Honda Hospital Replacement Project

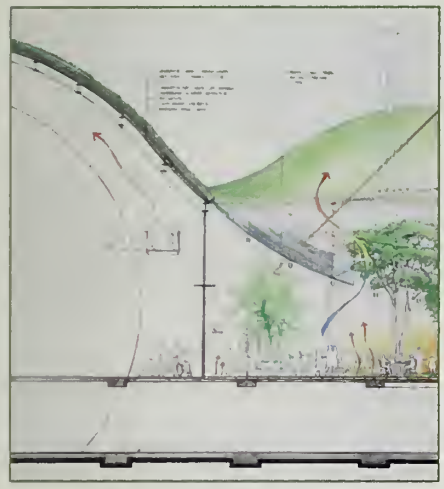
The Laguna Honda Hospital Replacement Project is the largest of the ten Green Building Pilot Projects. A major portion of the existing convalescent and rehabilitation hospital will be replaced providing long-term care in a modern facility. Project management is by DPW, and the project architect is Anshen+Allen with Gordon H. Chong and Partners. The design team has championed the concept of a "residential" feel by locating 60 residents on each floor or "neighborhood" which is divided into four "households" of 15 residents, each with its own living room and dining room.

The design team has set LEED Certified as the environmental standard for the project. Given the goal of providing a 1200-bed rehabilitation facility, it has been a challenge to keep the environmental goals intact while working within the voter-approved bond financing of $401M. Cost estimates developed after the Schematic Design phase were significantly over this budget, and modifications were necessary to align the project to the available funding. In this context, a LEED Certified rehabilitation hospital will be a major accomplishment, especially since no additional funding was identified or provided for green building aspects, and that the construction budget has not been augmented to maximize long-term green building operational savings of reduced energy, water and maintenance.

However, Laguna Honda could become the first green hospital in the nation, and will integrate many green building features, including natural daylighting and ventilation, a well-insulated shell, efficient heating, ventilating and air-conditioning (HVAC) systems, solar hot water, natural landscaping methods, elimination of toxic materials including mercury, arsenic and PVC, and special attention to indoor environmental quality (IEQ). Design work began in February 2001 and will continue through 2004. Construction will take place from 2002 through 2006, and will be properly phased so that resident care will not be interrupted.

9. The New California Academy of Sciences





GORDON H CHONG
& Partners

Renzo Piano

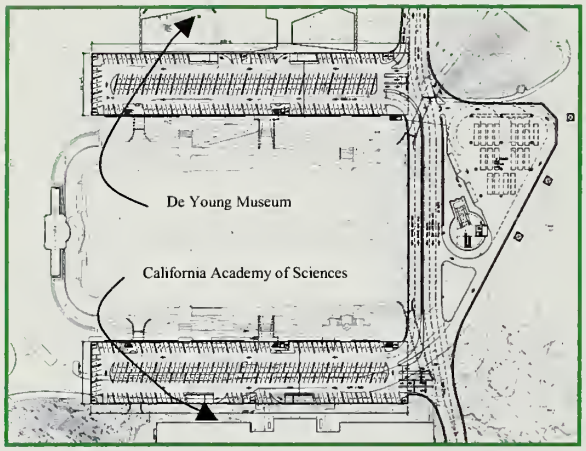
Founded in 1853 as the first scientific institution in the West, the California Academy of Sciences' mission is to explore and explain the natural world. It is one of the ten largest natural history museums in the world, and hosts over 800,000 visitors annually. The Academy consists of twelve connected buildings that were constructed between 1916 and 1990. Due to seismic damage and aging facilities, the Academy has embarked on a major reconstruction and renovation of its facilities in Golden Gate Park.

This historic facility is a natural history museum, aquarium, and planetarium, as well as a working scientific research laboratory. The New Academy will be a physical embodiment of the Academy's mission to understand and protect the natural world. A model of environmental responsibility, the building will serve as an extension of the exhibition program and highlight the green building features for the public.

The Academy has hired internationally known architect Renzo Piano of Genoa, Italy as executive architect, and Gordon H. Chong & Partners as the local architectural firm. Exhibit specialists have been retained to modernize scientific displays with new visual and auditory multi-media effects. The New Academy will utilize the existing building footprint to minimize impacts on Golden Gate Park. Key elements of the architectural heritage will be retained.

The design team is developing many innovative building systems. Natural ventilation, efficient water and energy use, and renewable energy such as solar electricity are natural candidates for exhibiting environmental awareness, as are natural, durable and non-toxic materials choices. A curvilinear "planted roof" will visually integrate the museum into the natural setting of Golden Gate Park, at the same time reducing stormwater runoff, adding insulating value, and providing another opportunity for the public to see the museum as an exhibit of sustainability. Design work is expected to continue through 2003, with construction extending from 2004 through 2007.

10. Golden Gate Music Concourse Underground Parking Facility



The Golden Gate Park Revitalization Act or Proposition J was passed by the voters of San Francisco in 1998 with the goal of creating a sustainable Park. The proposition formed the Golden Gate Park Concourse Authority to direct the revitalization of the Park, "to beautify and enhance the natural and scenic landscape of the of the Concourse Area of Golden Gate Park" and " to reduce the impact of automobiles on Golden Gate Park, and to provide long-term assurance of safe, reliable and convenient access for visitors".

To accomplish this goal, the Concourse Authority is directing the design and construction of an underground parking structure within the Concourse area. The underground parking structure will contain approximately 800 parking spaces. A corresponding number of parking spaces will be removed from surface roads in the Park. The underground structure will be entered via a tunnel from outside the Park, thereby reducing automobile traffic and congestion in the Park while still providing access for visitors.

The Golden Gate Park Concourse Authority has retained Gordon H. Chong & Partners as architects for the facility. It will consist of two, two-level parking structures, one located beneath Tea Garden Drive between the new M. H. de Young Museum and the Music Concourse, and the second beneath Academy Drive between the California Academy of Sciences and the Music Concourse. An underground tunnel at the east end of the Music Concourse will connect the two structures.

The design team is utilizing the LEED Green Building Rating System as a framework for the environmental design. During construction, a waste management plan will allow for a high percentage of recycling and diversion of materials from the landfill. Thoughtful placement of the facility results in minimal disturbance to existing landscaping, and historic and cultural resources. New landscaping materials will be drought-tolerant to reduce irrigation needs. A continuous garden slot at the long edge of the parking structures will allow natural light and fresh air to penetrate the two subterranean floors while decreasing the need for artificial lighting. Collected stormwater will be filtered and then recharged into the Park's natural aquifer. Material selection will include high fly ash content concrete, as well as recycled rubber materials for pavers and walkways. Non-toxic paint will be used to maintain air quality. Great emphasis is placed on developing convenient underground way-finding and a safe interior environment. These strategies reinforce the dedication of the project to integrate ecologically and visually into Golden Gate Park. Design work will continue through 2002. Construction of the parking structure is scheduled to start in the spring of 2003 and be completed by early 2005.

Appendix B
Program Expenditures

Source of Funds:	Total Amount:	Amount Disbursed:	To:	Tasks:
CIWMB Grant	$72,000	$72,000	Global Green USA	Training Program
				Design Tool Kit
PUC/HHWP	$11,750	$9750	BOA	SF Environment & BOA Staff Training
		$2000	NAA	IAQ Laguna Honda
PUC	$146,244	$21,000	BVA	Ordinance Amendment
		32,244	BVA	LEED Compliance Manual
		$50,000	BVA	Multi-family Design
		$10,000	BVA	Residential Guidelines
		$10,000	BVA	Web-based Toolkit
		$13,000	BVA	EcoCenter Displays
		$10,000	BVA	Sites Workshop
General Funds	$100,000	$9,098	BOA	Staff Training
		$6276	BOA	Case Studies
		$12,462	BOA	Coordination and Meetings
		$8375	USGBC	LEED Trainings
		$3789	SF ENVIRONMENT	Conference Fees
SUBTOTAL	$329,994	$269,994		
	-$60,000		BOA- fund transfer failed, returned to General Fund 8/01	Allocated but not spent for Energy Modeling at Laguna Honda Hospital
TOTAL	$269,994	$269,994		

SF Environment

SF Environment is the Department of the Environment for the City & County of San Francisco.

Our mission is to improve, enhance, and preserve the environment, and to promote San Francisco's long-term environmental well being. We help neighborhood groups meet their environmental interests by matching them up with the right City departments, and provide a central outlet for environmental information and referral services.

SF Environment advises the Mayor and Board of Supervisors on all environmental matters, develops environmental policies and legislation and coordinates the City's environmental programs

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